Session IX Agenda

I. Status Update & Stakeholder Feedback– **60 minutes**
- Introducing James Russell - CRA
- DESC IRP Process & Schedule Update
- Stakeholder Engagement Since Session VIII
- Review of Stakeholder Homework From Session VIII

II. 2022 IRP Update **– 30 minutes**
- Key Takeaways
- Build Plans and Cases
- Summary of Core Build Plans
- Modeling Results

<15 min break>

III. Stakeholder Rapid Feedback **– 30 minutes**

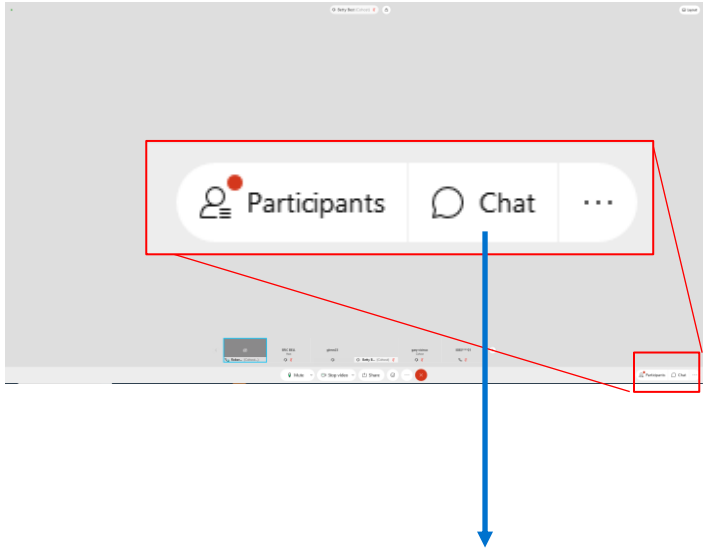
IV. 2023 IRP **– 30 minutes**
- Key Changes

V. Preparing for Session X and Next Steps – **15 minutes**
- Setting Expectations for Session X
- Session IX Homework

Q&A

- Microphones will be muted during presentations; we will open them when addressing questions at end of each section
- During presentations, questions can be submitted via the chat function
  - Only questions submitted in writing will be answered during live Working Group Sessions
- Each questioner will be allowed one follow-up question before they yield the floor to the next questioner
  - Please don't ask multiple questions in one question
  - If time permits and all questioners are answered, we will come back for additional questions
- All Q&As will be responded to in writing and placed on the web page:
  - https://www.DESC-IRP-Stakeholder-Group.com

Look for the chat function in the bottom right hand corner of the WebEx screen



Please type questions into the group chat

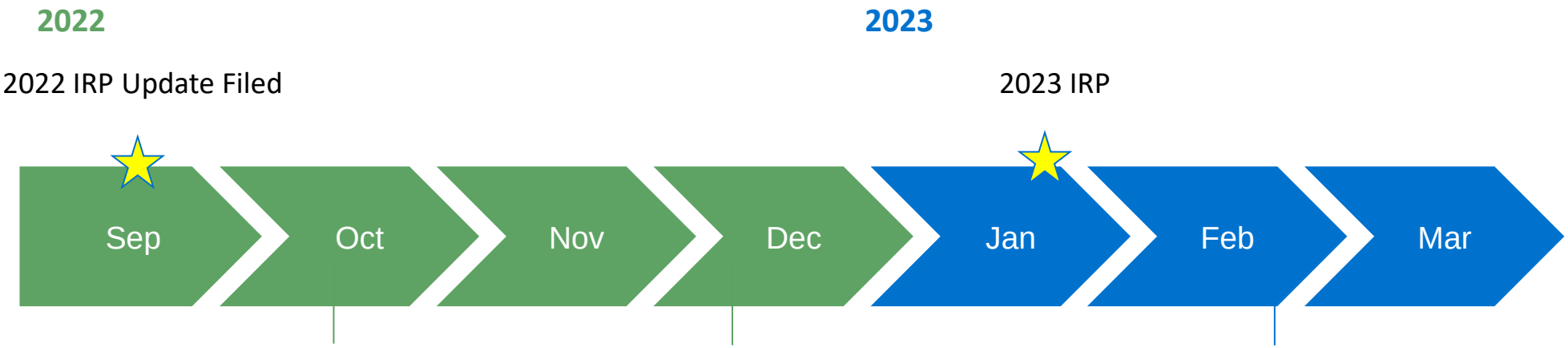
DESC IRP Stakeholder Advisory Group Meeting #9

I. Status Update & Stakeholder Feedback

Status Update & Stakeholder Feedback

- Introducing James Russell - CRA
- DESC IRP Process & Schedule Update
- Stakeholder Engagement Since Session VIII
- Review of Stakeholder Homework From Session VIII
- *Discussion*

DESC IRP Process & Schedule Update



Session IX

- Report on Stakeholder Feedback
- 2022 IRP Update
- Rapid Stakeholder Feedback
- 2023 IRP Key changes

Session X

- Report on Stakeholder Feedback
- 2023 DSM PS and RM/ELCC Study
- 2023 IRP Inputs
  - Load Forecast
  - Fuel Forecasts
  - Market Scenarios
  - Candidate Resource Options
  - Risk Metrics & Resource Evaluation
- Status on 2022 TIA
- Implications of IRA on future IRPs

Session XI

- Report on Stakeholder Feedback
- 2023 IRP Key Takeaways and modeling results
- Identify short- and long-term goals for future stakeholder engagement

Stakeholder Engagement Since Session VIII

- Session VIII-A: DSM Modeling Techniques

- 2022 IRP Update: New Unit Inputs Comments & Feedback
  - PLEXOS inputs for the 2022 IRP Update provided to Stakeholders in mid-July
  - Stakeholder comments received end of July
  - Additional files shared on SharePoint site in August
  - DESC responses provided in early September
  - Intend to submit 2023 IRP New Unit Inputs ahead of filing

Session VIII Homework

General Feedback

1. What topics should DESC add to the agenda at Session IX or as part of a future Stakeholder Session?

Modeling Approach

2. What other elements of the Retirement Study, if any, should be carried forward into future IRPs?
3. Do you agree with the approach of carrying forward RP8 from the 2021 IRP Update even though an optimization approach will be used in future IRPs?

New Unit Assumptions

4. What additional resource types, if any, should DESC consider in the 2022 IRP Update and future IRPs?
5. Are the (forthcoming) cost & performance assumptions provided by DESC reasonable, what changes are needed?
6. Are the (forthcoming) ELCC values for new storage resources reasonable, what changes are needed?

Market Scenarios

7. Are the proposed Market Scenarios for the 2022 IRP Update reasonable, what changes or additional scenarios do you suggest DESC consider in future IRPs?

Risk Metrics

8. What risk metrics should DESC include in the 2022 IRP Update and future IRPs given the format of the outputs?

Other Feedback

1. Agenda Feedback: Topics to address at future sessions.

Stakeholder Comments	Response / Action Taken
Stakeholders would like an update on the Reserve Margin Study that is ongoing ahead of the 2023 IRP.	DESC has selected the vendor, is executing an agreement, and is currently assembling necessary data requirements to move forward with the Reserve Margin/ELCC Study. Results from the Reserve Margin/ELCC study will be discussed with stakeholders as soon as available and included in the 2023 IRP.

1. Agenda Feedback: Topics to address at future sessions.

Stakeholder Comments	Response / Action Taken
Please include a discussion of results from the additional TIA scenarios studied for Q3 2022 and how they will be incorporated into the 2022 IRP update and the 2023 IRP. If the study is not yet complete and stakeholders have not had a chance to review the scenarios assessed, a discussion should be included as part of Session IX since the Coal Retirement Study comments will already have been submitted on June 27, 2022.	DESC will discuss results with the Stakeholders at an upcoming meeting once they are available. Results of the 2022 TIA will be incorporated in future IRPs once available.
During Session VIII, stakeholders expressed concerns regarding DESC proposed annual build limits of 300 MW per year and 150 MW per year of solar and battery storage resources, respectively. Please include a discussion of DESCs justification for annual build limits of solar and storage and provide sensitivity results if this constraint is relaxed (if available).	DESC will provide a basis in upcoming IRP/Updates for assumptions regarding any annual limits on new resource additions.

1. Agenda Feedback: Topics to address at future sessions.

Stakeholder Comments	Response / Action Taken
We request additional discussion on the methods DESC plans to use to calculate the effective load carrying capability ("ELCC") (marginal versus average), and which resource types will be evaluated, and what methods will be used in the resource adequacy modeling.	These topics will be discussed in future stakeholder meetings.
DESC provided a review of different risk metric strategies used by neighboring regions for evaluating resource portfolios. We ask that DESC provide which risk metric approach they will implement for future IRPs and a discussion on why other approaches were not chosen.	Risk metrics similar to the 2021 Update and the Coal Plants Retirement Study will be used. DESC plans to include build plan sensitivity (within compatible scenarios).

1. Agenda Feedback: Topics to address at future sessions.

Stakeholder Comments	Response / Action Taken
There often is insufficient time to allow stakeholders the opportunity to provide feedback on the analyses and/or we don't hear about all the critical assumptions until the analysis is finalized. We ask DESC to give stakeholders the opportunity to review draft analyses in their entirety, as well as prepare stakeholder slides as if DESC were on the receiving end of information.	DESC will continue to provide updates on draft analyses, but requests feedback on complete analyses once finalized and submitted. We appreciate and value stakeholder input as evidenced by stakeholder presentations at Session VIII-A and encourage future opportunities for similar engagement.
There has been a marked shift in the tenor of reaction to stakeholder suggestions in the IRP Stakeholder Process. Whereas before DESC seemed open to negotiate ways to resolve stakeholder concerns, we increasingly see a refusal to even entertain ways to alleviate concerns. We are not asking or expecting DESC to simply adopt our suggestions, but there are frequently opportunities to expand the content of the analysis in question to help resolve concerns and/or find consensus.	DESC remains open to Stakeholders and has acted on many of the suggestions provided by Stakeholders throughout the IRP Advisory Process. We welcome the opportunity to discuss and debate topics. However, not all are practical and some suggestions conflict with Commission orders and directives.

1. Agenda Feedback: Topics to address at future sessions.

Stakeholder Comments	Response / Action Taken
We have provided some thoughts in advance of the anticipated meeting to discuss modelling energy efficiency (EE). DESC already employs a handful of these recommendations, but we have compiled a list of typical best practices for modeling differing levels of energy efficiency: • Group EE at least by sector and potential level • If the model does not select EE, weed out programs with more expensive lifetime costs • Reduce program costs by co-benefits that cannot be explicitly represented in IRP model • Convert savings at the meter to savings at the generator using marginal line losses • Levelize program costs	Thank you for the list. We have provided it to our DSM team who has already shared it with the ICF Planning Team. This discussion is more appropriate to be addressed by the Energy Efficiency Advisory Group.

1. Agenda Feedback: Topics to address at future sessions.

Stakeholder Comments	Response / Action Taken
We hope there will be a more robust conversation about the parameters of the next Transmission Impact Analysis before the study commences, so that the upgrade costs and mitigation options can be more thoroughly and accurately explored for the 2023 IRP.	The 2022 TIA draft was discussed and shared with stakeholders prior to submission. Many items requested by stakeholders were incorporated into the 2022 TIA. As previously stated, the 2022 TIA results will be shared with stakeholders when available at a future stakeholder meeting.

2. Elements of the Retirement Study to Use in Future IRPs?

Stakeholder Comments	Response / Action Taken
Stakeholders expects that the upcoming IRPs will consider the same kinds of costs and benefits (including costs related to ELG upgrades, capital, fuel, O&M, transmission upgrades, gas pipeline expansion, etc.), as well as the prudency and timing of ELG related expenditures versus retirement options. Beginning no later than the 2023 IRP, we expects that DESC will evaluate ratepayer risks, including volatility in natural gas and coal prices, pressures associated with carbon and other environmental regulations/legislation, and reliability and resilience considerations, in making final retirement decisions.	DESC appreciates these comments and looks forward to discussing them in future stakeholder sessions.

2. Elements of the Retirement Study to Use in Future IRPs?

Stakeholder Comments	Response / Action Taken
The framework for the Coal Retirement Study has been useful for studying the feasibility of various retirement dates, and in identifying assumptions that will be used in future IRP studies. However, there are some improvements that we recommend should be included in future IRPs. This includes an expanded TIA that evaluates on-site replacement for Williams, the inclusion of location specific gas-pipeline and transmission upgrade costs, and a more refined construction timeline estimate.	Thank you for your recommendations. DESC has already requested a second TIA, the 2022 TIA, that incorporates the on-site replacements. Results from 2022 TIA will be included in future IRPs.

2. Elements of the Retirement Study to Use in Future IRPs?

Stakeholder Comments	Response / Action Taken
The coal retirement study clearly indicates that early retirement of the Wateree and Williams coal plants is cost effective and beneficial to customers under a majority of the retirement scenarios studied. This key finding should be carried forward into future IRPs as DESC plans for capacity replacements and conducts its future IRPs.	Thank you for the comment. The results from the Coal Plants Retirement Study will inform the 2022 IRP Update.
The information provided in the Transmission Impact Assessment ("TIA") is valuable for the IRP analysis. We suggest DESC go one step further and incorporate transmission constraints into their production cost modeling using either a nodal, or zonal (pipe and bubble) modeling approach. This setup in PLEXOS would be informed by a detailed transmission analysis where constraints like the simultaneous import limit into Charleston or import/export limits between neighboring regions could be captured and better reflect resource dispatch and constraints on DESCs system.	Thank you for the comment.

2. Elements of the Retirement Study to Use in Future IRPs?

Stakeholder Comments	Response / Action Taken
While the Coal Retirement Study provided a short description of the job benefits from construction and operation of natural gas and solar power plants, DESC should broaden their assessment of replacement resources to include property tax benefits, geographic distribution of benefits, health benefits due to reduced EPA criteria pollutants and differences in CO2 emissions for resource classes (e.g. solar, storage, nuclear, natural gas, etc.).	The Coal Plants Retirement Study has been completed and these benefits could be explored with future replacement resources.
It is our understanding that DESC intends to carry forward the Williams and Wateree retirement dates from the study. As described comments from Docket No. 2021-192-E, there are substantive concerns with the accuracy of the retirement study. Using the “optimal” dates from the study is a reasonable starting point, but DESC ought to examine earlier Williams retirement dates as well.	DESC sees the dates from the retirement study as “no-earlier-than” dates rather than “optimal” dates.

3. Agree with carrying RP8 approach despite use of optimization?

Stakeholder Comments	Response / Action Taken
Stakeholders would like to see both an optimized portfolio and the RP8 portfolio modeled in the 2022 IRP. This will allow for a comparison of optimized portfolios to the current preferred plan, and allow stakeholders to better understand the Company's optimization methodology ahead of the 2023 IRP.	DESC will include this comparison in the 2022 IRP Update.
Yes, optimization of portfolios does not need to be the only approach that DESC uses. Carrying forward RP8 also makes sense because it gives some consistency of analysis from prior IRPs to future ones.	Thank you for your comments.

3. Agree with carrying RP8 approach despite use of optimization?

Stakeholder Comments	Response / Action Taken
We agree with DESC that RP8, the preferred plan from the 2021 IRP Update, should be considered in future IRPs. Specific scenarios should also be considered and assessed for NPVRR and analyzed using DESCs chosen risk metrics. We also suggest that DESC should consider portfolios R06 and R06b from the Coal Retirement Study comments, which consider an accelerated retirement of Williams in 2028 and a scenario that includes a standalone storage or other replacement resource located at or near the Williams site.	DESC plans to evaluate replacement of some generation at the Williams site as proposed by Stakeholders. DESC believes the 2028 retirement date for Williams is infeasible as described in the Coal Plants Retirement Study.

4. Additional resource types to consider?

Stakeholder Comments	Response / Action Taken
Has the Company considered wind or Reciprocating Internal Combustion Engines as a potential future resource and could the Company please discuss its evaluation of wind as a potential future resource?	Yes. New Aeroderivative CTs are included as selectable candidate resources in the 2022 IRP Update. Reciprocating ICT characteristics are very similar to those resources. Offshore wind is also included as a selectable candidate resource in the 2022 IRP Update.
The resources included on slides 38 and 39 of Session VIII are reasonable. The data sources proposed for both thermal and renewable resources are a reasonable starting point. Stakeholders will continue to evaluate the reasonableness of these assumptions using the most up-to-date data assumptions available in each proceeding.	Thank you for the comment.

4. Additional resource types to consider?

Stakeholder Comments	Response / Action Taken
Stakeholders recommend that DESC consider additional levels of energy efficiency and demand response, modeled as supply-side candidate resources that can be selected by the model. While DESC has stated they intend to assess whether higher levels of DSM are feasible, they should also assess whether PLEXOS' optimal expansion plan selects these resources in their analysis.	DESC intends to model DR as a selectable resource as the data from the 2022 Market Potential Study becomes available. Levels of EE are developed by the EEAG in compliance with Commission Requirements.
We would recommend that DESC also consider inclusion of: • Medium and long duration storage, e.g., 10-, 12-, 50-, and 100- hour storage • Distributed solar and battery storage (under the presumption that the only utility cost is an incentive paid to participants in such a program) • Time of use rates for electric vehicles and water heating • Offshore wind	As advanced technologies become available and cost effective, DESC will consider modeling them in future IRPs.

5. Cost & performance assumptions provided by DESC reasonable?

Stakeholder Comments	Response / Action Taken
Stakeholders reviewed the Company's PLEXOS input assumptions as part of the coal retirement study and found that DESC's proposed fixed and variable O&M costs were quite different from other sources. The Company should continue to review fixed and variable O&M assumptions for CC and CT resources and consider adjustments as appropriate. In upcoming IRPs stakeholders will continue to compare the Company's cost and performance input assumptions to recent publicly available data of comparable resources, including estimates from NREL, Lazard, EIA, etc.	Thank you for your comments. DESC will review cost input assumptions as suggested by Stakeholders.

5. Cost & performance assumptions provided by DESC reasonable?

Stakeholder Comments	Response / Action Taken
We appreciate DESC's continued use of the NREL ATB cost assumptions for their solar and storage candidate resources, including using the recently released 2022 ATB which provides DESC and stakeholders a transparent data source where all parties can review and understand the assumptions incorporated in the capital cost trends for different technologies.	Thank you for the comment. DESC will use NREL ATB, DE Green Sheets, or other industry source if one is determined to more closely represent actual project cost in DESC's service territory.
We do not support the use of DESC's "Green Sheets" for thermal unit cost assumptions. Historically, the assumptions used to determine the capital cost of thermal resources in the Green Sheets are vague and are difficult for stakeholders to verify against alternative thermal resource capital cost sources such as the U.S. EIA or NREL ATB. We request that DESC use a consistent set of transparent cost assumptions for candidate resources so drivers in cost reductions or increases are clear to stakeholders.	DESC receives capital cost from DE Project Construction Group. These costs are based off real construction expenditures that are specific to location and current market conditions.

6. ELCC values for new storage resources reasonable?

Stakeholder Comments	Response / Action Taken
Slide 9 discusses the Intervenors proposed ELCC values and the Company's response and proposed action. Stakeholders agree that it would be reasonable to use the proposed schedule of declining ELCC values as a temporary measure for the 2022 IRP, however, we support use of results from the ELCC study to inform the 2023 IRP as the Company noted.	DESC has created a declining schedule of ELCC values in a similar manner as suggested that includes 8-hour battery storage as suggested by Stakeholders. DESC will share the results from the Reserve Margin/ELCC Study with Stakeholders as soon as available in a future stakeholder meeting and plans to include the results in the 2023 IRP.

6. ELCC values for new storage resources reasonable?

Stakeholder Comments	Response / Action Taken
Yes, the suggested ELCC values for new storage resources are reasonable, provided they are used as temporary values before a more detailed resource adequacy, planning reserve margin, and ELCC study can be conducted.	Thank you for the comment.
We would like additional information on the studies, methodologies, and assumptions being considered by DESC for the resource adequacy assessments .	Results from the Reserve Margin/ELCC Study will be discussed with stakeholders as soon as available and included in the 2023 IRP.

6. ELCC values for new storage resources reasonable?

Stakeholder Comments	Response / Action Taken
An alternative suggestion for storage ELCC values is to use the Coal Retirement Study hourly production cost results to approximate capacity credits. This can be done by calculating the average output of storage resources (and other technologies) during the tightest margin hours (i.e. lowest 2% of hours annually). Calculating resource availability during low margin hours will likely track ELCC calculations closely and can be computed with limited effort.	Thank you for the comment.
While it is important to consider the ELCC of storage resources, similar attention should be given to solar, coal, gas, hydro, etc. There is no such thing as perfect capacity and similar methods for calculating ELCC should be applied to thermal resources as well. We recommend using a temporary value of a thermal unit's capacity minus the equivalent forced outage rate as the firm capacity value until a more in-depth analysis can be completed.	DESC intends to incorporate recommendations of the pending Reserve Margin/ELCC study in its 2023 IRP.

7. Proposed Market Scenarios for the 2022 IRP Update reasonable?

Stakeholder Comments	Response / Action Taken
Stakeholders would like the Company to include coal price and/or coal availability sensitivity cases in the upcoming IRPs and encourages ongoing discussion with stakeholders about additional market scenarios and ways market sensitivity variables interact with each other. We will continue to evaluate whether the set of the Company's selected Market Scenarios encompasses a "wide but plausible" range of each variable.	DESC's Market Scenarios will include fuel price sensitivities for the 2022 IRP Update that capture the correlation between natural gas and coal prices. The High Fuel case is being considered as a good proxy for the financial impact of a coal constrained scenario.

7. Proposed Market Scenarios for the 2022 IRP Update reasonable?

Stakeholder Comments	Response / Action Taken
We appreciate the opportunity to suggest additional market scenarios for DESC to consider for future IRPs. We have proposed three additional market scenarios which can be readily implemented using DESCs existing input assumptions. Overall, we does not think the current proposed market scenarios reflect the risk of high fuel prices or low load growth scenarios.	Thank you for the proposed scenarios. They will be considered in the development of the 2023 IRP.

Table 2: Proposed Additional IRP Market Scenarios

Scenario Name	Fuel Price	CO2 Price	Load	DSM	Notes
High fuel price and medium CO2 price with smarter electrification	High	Medium	Low	High/ Cost Effective	Represents a future where domestic fuel resources lack supply side investment in coal and natural gas, and state and federal policies increase fuel prices. Electrification continues, but with commensurate efficiency improvements and demand side management.
Increased environmental regulation with Increased DSM development	High	High	Mid	2% DSM	A future where high fuel prices and a high CO2 price push electrification to progress faster. Higher load growth coupled with less investment in conventional generation or retirement due to high costs prompts more aggressive development of DSM potential in the market. Increased technological advancements in aggregating customer load, EVs and industry incentives to save on energy presents higher DSM and EE use as a more cost-effective measure to curb energy demand and peak load versus building more capacity.
Supply side fuel commodity restrictions	High	Zero	Low	High/ Cost Effective	This scenario is a future where CO2 price regulation is absent and load growth maintains historical levels and is relatively flat. High fuel prices persist due to supply side underinvestment due to capital shifting away from fossil fuels and the market factoring climate change risks into company valuations. Load growth remains low due to economic recession and high inflation which offsets growth due to electrification.

7. Proposed Market Scenarios for the 2022 IRP Update reasonable?

Stakeholder Comments	Response / Action Taken
It is our understanding that natural gas prices during the period 2022-2024 will be updated with current market forwards. The pricing presented at the June 8th meeting is far below current NYMEX forwards, so this adjustment makes sense to us.	Thank you for the comment.
We do have some concerns about relying on the AEO 2022 to capture the likely trajectory of gas prices in the Base Case. DESC's base case settles out at about $3.50 per MMBtu but current forwards are generally in the range of $4.00 per MMBtu or higher. As such, we are concerned that the proposed Base case is too low. CRA does its own fundamental forecasts of gas prices, so it would be worth comparing their current projections against DESC's proposed pricing.	Per PSC directive, DESC will continue to use publicly available forecasts for gas price inputs. CRA's projections are not publicly available and as such cannot be used.

8. Risk metrics DESC should include?

Stakeholder Comments	Response / Action Taken
Stakeholders would like the Company to discuss the possibility of modeling risk factors in PLEXOS stochastically, instead of hard-coding combinations of risk factors. A stochastic approach can also accurately capture the inherent volatility in the gas and coal commodity markets. At present the Company's gas and coal price forecasts escalate steadily over time, which differs from real world commodity prices that move up and down over time in a random pattern. By modeling stochastically, the Company's gas and coal forecasts could account for temporary commodity price spikes like those occurring presently, and could optimize future expansion plans around such volatility.	Based on the short timeline before the 2023 IRP submission, DESC intends to prioritize stakeholder engagement on the results of the Market Potential Study, Reserve Margin Study, and TIA update. DESC continues to support exploring the use of stochastic in the IRP process DESC plans to add this topic for discussion at stakeholder sessions following the 2023 IRP.

8. Risk metrics DESC should include?

Stakeholder Comments	Response / Action Taken
We recommend that DESC should include risk metrics in line with a minimax regret score and the TVA Monte Carlo distribution method. Combining these two approaches provides DESC with many scenario results based on the stochastic sampling of inputs with the benefit of a simple minimax regret score for each portfolio option across many scenarios.	Thank you for your recommendation. For the 2022 IRP Update and 2023 IRP, DESC plans to use risk metrics consistent with the 2021 IRP Update. DESC is open for discussion on the topic of risk metrics.
Alternatively, DESC could select the optimized portfolios from their deterministic capacity expansion modeling under the DESC and stakeholder proposed market scenarios and then conduct a spreadsheet analysis of the robustness of each portfolio against a range of sensitivities that go beyond the small subset of market scenarios embedded in PLEXOS. The objective of this risk assessment isn't necessarily to only minimize costs or NPVRR, but also to minimize the worst-case outcome from a portfolio selection.	As mentioned above, DESC is open to considering different approaches to risk analysis.

8. Risk metrics DESC should include?

Stakeholder Comments	Response / Action Taken
DESC could incorporate the following metrics to be sampled stochastically by PLEXOS or resolved as sensitivities in a spreadsheet analysis using the optimized PLEXOS portfolios: • A range of capital cost assumptions to test robustness of chosen portfolio CapEx • A wider range of natural gas and coal price forecasts to test for fuel price sensitivities • A wider range of load forecasts to identify risks of building capacity for load that does not materialize • A range of demand response forecasts and EV charging profiles	Thank you for your comment. DESC does not conduct stochastic modeling in its IRP process due to the extensive run times required and the level of complexity involved. DESC is open to discussing the benefits of stochastic modeling in future IRP planning. DESC does currently utilizes a simplistic stochastic model to calculate the coal burn in its production cost modeling.

8. Risk metrics DESC should include?

Stakeholder Comments	Response / Action Taken
We are concerned with the proposal to narrow the retirement dates to those that were “optimal” in the retirement study and to apply strict tunnel constraints to resource additions will likely narrow the portfolios to a few outcomes. We are concerned that this doesn’t allow DESC to meet the requirements of Act 62.	The results of the Coal Plants Retirement Study will inform the 2022 IRP Update as ordered by the Commission. Any constraints to resource additions will be fully explained.
We would propose that DESC model portfolio performance during extreme events, ideally both winter and summer. This would include changes in performance of both supply-and demand-side measures, weather correlated outages and/or partial outages, changes in load, changes in DSM performance etc.	DESC’s current reserve margins for both winter and summer do factor in impacts from extreme events. As previously discussed, DESC has engaged a vendor to conduct a Reserve Margin/ELCC study to inform DESC’s 2023 IRP.

Other feedback since Session VIII

Stakeholder Comments	Response / Action Taken
DESC seemed to be saying during the meeting that it would not model the DSM levels in the Commission Order because its market potential study would not be completed in time for the 2022 IRP Update. DESC has repeatedly pointed to its forthcoming MPS as the information upon which it prefers to rely in order to characterize available DSM and yet it apparently does not need this information to conclude that the prescribed savings levels are unachievable. It is hard to see how both positions could be true. In addition, to date DESC has failed to work with the EEAG to even consider how to model these savings levels, despite the fact that it is required by Commission order.	Following PSC Commission Order 2020-832, the 2023 IRP will include the results from the new DSM Potential Study performed in collaboration with the Energy Efficiency Advisory Group. This study will include a comprehensive evaluation of the cost-effectiveness and achievability of DSM portfolios reaching 1% and higher savings including savings levels of 1.25%, 1.5%, 1.75% and 2.0%. Since the new study is currently underway, the results were not available to be included in 2022 IRP. The study timeline and updates have been shared with both the Energy Efficiency Advisory and IRP Stakeholder groups and will continue prior to the filing of the 2023 IRP.

Other feedback since Session VIII

Stakeholder Comments	Response / Action Taken
The language in the 2020 IRP order echoes the language of Act 62, which requires “several resource portfolios developed with the purpose of fairly evaluating the range of demand-side, supply-side, storage, and other technologies and services available to meet the utility's service obligations. We are not interested in the Company conducting various planning analyses to check off certain boxes. Rather, we believe these analyses should be of substance and should inform decision-making. We would welcome the opportunity to work with DESC to develop an analysis that fully satisfies the Commission’s order and can be achievable in time for the 2022 IRP Update.	The Commission ordered DESC to include these requirements in its 2021 IRP Update. In its directive dated, July 28, 2022, the Commission ruled that Dominion has met the requirements for the 2021 IRP Update. DESC is happy to work with stakeholders to improve its integrated planning; however, its position is that the Company has fully satisfied the Commission’s order and will continue to meet Act 62’s requirements in future IRPs.

Other feedback since Session VIII

Stakeholder Comments	Response / Action Taken
Data from the American Council for an Energy-Efficient Economy's ("ACEEE") 2020 Utility Energy Efficiency Scorecard was used to compare the use of energy efficiency programs by DESC, Georgia Power, and Duke North Carolina in 2018. While the data is 5 years old, it suggests that DESC may be missing opportunities to further employ energy efficiency and bring savings to its customers.	Thank for the feedback and information from ACEEE. We have shared this information with the DSM team. It should be noted the 2023 DSM Potential Study will be grounded in DESC service territory data to include updated residential and non-residential market characterization data that will feed into the new study.

Other feedback since Session VIII

Stakeholder Comments	Response / Action Taken
During the workshop, DESC said that it was open to using NSRDB data if can be validated as consistent with observed values. It appears that DESC did not take any steps to do this validation itself nor explore the documentation of the NSRDB. It is not clear why DESC could not or should not validate actual outputs from solar sites against the NSRDB itself. DESC is in a better position than stakeholders to know the precise locations of the existing sites and needed specifics such as the type of panel used.	DESC did investigate the NSRDB documentation and found inconsistencies as reported in Stakeholder Advisory Group Session VII. As such, we appreciate the suggestion, but will not be moving forward with the NSRDB data.

Questions? Please use the Chat function

DESC IRP Stakeholder Advisory Group Meeting #9

II. 2022 IRP Update

2022 IRP Update

- Key Takeaways
- Build Plans and Cases
- Summary of Core Build Plans
- Modeling Results
- *Discussion*

DESC 2022 IRP Update – Key Takeaways

- The 2022 IRP Update is operative for four months
  - 2023 IRP will be filed on January 30, 2023
- First full implementation of the Resource Optimization Model (i.e., PLEXOS)
- Retirement dates were informed by DESC's Coal Plants Retirement Study
- Small Modular Reactors and Off-shore Wind are available beginning 2040
- ***Updated Preferred Plan***: Optimized version of RP8
  - Williams 2030 Reference Build Plan

Dominion Energy

DESC's Coal Plants Retirement Study utilized PLEXOS for optimization using a limited number of candidate resource options for selection.

DESC 2022 IRP Update – Build Plans and Cases

Twelve Build Plans

Core Build Plans	Resource Plan 8 (RP8)
	Williams 2047 Reference
	Williams 2030 Reference
	High Fossil Fuel Prices
	Zero Carbon Cost
	Carbon Constrained
Sensitivity Cases	High CO2 Price
	Low Regulation
	Stagflation
	Aggressive Environmental Regulation
	Medium DSM
	Low DSM

Twenty-four Cases

- Eighteen Core Cases
  - Six Core Build Plans modeled against three Core Market Scenarios
- Six Sensitivity Cases
  - Fulfill requirements of the IRP Statute
  - Assume varying market conditions
    - CO2 costs, environmental regulation, economic and load growth, and DSM effectiveness

DESC 2022 IRP Update – Candidate Resources (MWs)

	Build Plans	Retirement	CC	Aero CT	Frame CT	Solar	Solar/ Storage	Battery	SMR	Off-Shore Wind	Total Generation Built	Retirements	Net MW
Core Build Plans	Resource Plan 8 (RP8)	WAT28 WIL30	553	342	523	2,100	0	713	0	0	4,231	(1,294)	2,937
	Williams 2047 Reference	WAT28 WIL47	0	468	523	750	1,500	1,088	0	0	4,329	(1,294)	3,035
	Williams 2030 Reference	WAT28 WIL30	0	0	1,046	750	1,500	1,013	0	0	4,309	(1,294)	3,015
	High Fossil Fuel Prices	WAT28 WIL30	0	234	523	1,125	2,400	1,538	0	0	5,820	(1,294)	4,526
	Zero Carbon Cost	WAT28 WIL47	0	0	1,046	750	1,050	938	0	0	3,784	(1,294)	2,490
	Carbon Constrained	WAT28 WIL30	1,114	0	0	1,125	2,400	1,200	1,140	1,000	7,979	(1,294)	6,685

DESC 2022 IRP Update – Selected Resources (MWs)

	Build Plans	Retirement	CC	Aero CT	Frame CT	Solar	Solar/ Storage	Battery	SMR	Off-Shore Wind	Total Generation Built	Retirements	Net MW
Core Build Plans	Resource Plan 8 (RP8)	WAT28 WIL30	553	342	523	2,100	0	713	0	0	4,231	(1,294)	2,937
	Williams 2047 Reference	WAT28 WIL47	0	468	523	750	1,500	1,088	0	0	4,329	(1,294)	3,035
	Williams 2030 Reference	WAT28 WIL30	0	0	1,046	750	1,500	1,013	0	0	4,309	(1,294)	3,015
	High Fossil Fuel Prices	WAT28 WIL30	0	234	523	1,125	2,400	1,538	0	0	5,820	(1,294)	4,526
	Zero Carbon Cost	WAT28 WIL47	0	0	1,046	750	1,050	938	0	0	3,784	(1,294)	2,490
	Carbon Constrained	WAT28 WIL30	1,114	0	0	1,125	2,400	1,200	1,140	1,000	7,979	(1,294)	6,685
Sensitivity Cases	High CO2 Price	WAT28 WIL30	0	0	1,046	750	2,250	1,125	0	0	5,171	(1,294)	3,877
	Low Regulation	WAT28 WIL30	0	0	1,046	600	1,350	938	0	0	3,934	(1,294)	2,640
	Stagflation	WAT28 WIL30	0	0	523	750	1,875	938	0	0	4,086	(1,294)	2,792
	Aggressive Environmental Regulation	WAT28 WIL30	0	0	2,092	1,125	2,400	1,538	0	0	7,155	(1,294)	5,861
	Medium DSM	WAT28 WIL30	0	0	1,046	750	1,950	1,238	0	0	4,984	(1,294)	3,690
	Low DSM	WAT28 WIL30	0	0	1,569	750	1,125	900	0	0	4,344	(1,294)	3,050

DESC 2022 IRP Update – 30 Yr Levelized NPV

	Build Plans	Market Scenario Inputs				Modeling Outputs		RP8 %△		
		Fuel	CO2 Price	Load Forecast	DSM	30 Yr LNPV ($000)	RP8 %△	Reference	High Fossil Fuel Prices	Zero Carbon Cost
Core Build Plans	Resource Plan 8 (RP8)	Base	Med	Base	High	$1,951	0.0%	0.0%	0.0%	0.0%
	Williams 2047 Reference	Base	Med	Base	High	$1,812	-7.1%	-7.1%	-6.8%	-8.2%
	Williams 2030 Reference	Base	Med	Base	High	$1,823	-6.6%	-6.6%	-6.0%	-6.9%
	High Fossil Fuel Prices	High	Med	Base	High	$2,175	11.5%	-5.9%	-7.4%	-5.6%
	Zero Carbon Cost	Base	Zero	Base	High	$1,684	-13.7%	-6.7%	-6.1%	-7.9%
	Carbon Constrained	Base	Med	Base	High	$2,182	11.8%	11.8%	3.1%	16.0%

DESC 2022 IRP Update – Carbon Emissions

		Market Scenario Inputs				Modeling Outputs			RP8 %△		
	Build Plans	**Fuel**	**CO2 Price**	**Load Forecast**	**DSM**	**2050 CO2 (Ktons)**	**% Reduction from 2005**	**RP8 %△**	**Reference**	**High Fossil Fuel Prices**	**Zero Carbon Cost**
Core Build Plans	Resource Plan 8 (RP8)	Base	Med	Base	High	10,331	45.6%	0.0%	0.0%	0.0%	0.0%
	Williams 2047 Reference	Base	Med	Base	High	10,659	43.8%	3.2%	3.2%	3.2%	3.2%
	Williams 2030 Reference	Base	Med	Base	High	10,820	43.0%	4.7%	4.7%	4.8%	4.9%
	High Fossil Fuel Prices	High	Med	Base	High	9,409	50.4%	-8.9%	-9.0%	-9.0%	-9.0%
	Zero Carbon Cost	Base	Zero	Base	High	11,174	41.1%	8.2%	8.0%	8.3%	8.0%
	Carbon Constrained	Base	Med	Base	High	2,863	84.9%	-72.3%	-72.3%	-72.4%	-71.1%

Questions? Please use the Chat function

DESC IRP Stakeholder Advisory Group Meeting #9

III. Stakeholder Rapid Feedback

Stakeholder Rapid Feedback

- Energy Futures Group
- Sierra Club
- *Discussion*

Rapid Feedback – 2022 IRP Update

- IRP assumptions:
  - Coal Retirement Study and TIA
    - Reiterate comments in response to the June 8th Stakeholder meeting.
  - DESC should clarify if, and how, it will incorporate the provisions of the IRA into the analysis and modeling of the 2023 IRP.
    - Impacts be evaluated in the load forecast, on the supply side, and in the MPS.
- Modeling:
  - Build Constraints
    - In general, EFG's position is that build constraints should be used to help manage run times, but should be relaxed if they are binding.
  - Some capacity factors appear anomalous in the outer years of the modeling results.
    - For example, gas turbine capacity factors are extremely high in last 8 years of planning period.
- DSM:
  - For the 2023 IRP, DESC should explicitly model in PLEXOS all MPS level including but not limited to the 2%.

Sierra Club 2022 IRP Update Rapid Feedback

Sierra Club and its experts have had limited time to review the 2022 IRP update. Given the short timeline between the 2022 IRP Update and the 2023 IRP, plus the IRA developments, Sierra Club provides only a limited review.

1) **Timing of Coal Plant Retrofits and Retirements**
   - Sierra Club has provided numerous comments that the timing of the Williams Retirement (2030) is delayed, and should be accelerated to 2028 to avoid ELG upgrades
   - DESC has not properly evaluated faster replacement alternatives that do not require significant transmission upgrades or gas pipeline builds
   - Request an additional sensitivity that shows the portfolio assuming a 2028 retirement date, no ELG upgrades, even if DESC does not standby the replacement timeline
2) **Need for Coordinated Transmission Planning**
   - PLEXOS model should be updated to include nodal or zonal transmission representation for Charleston import constraint
   - DESC Transmission Planning should provide maximum interconnection at specific nodes that avoid major transmission upgrades
3) **Resource Adequacy Analysis Requires more Detail**
   - Probabilistic LOLE and ELCC analysis needs to be scoped in more detail
   - Please provide scope, methods, assumptions of "the probabilistic Reserve Margin and ELCC study by late 2022 to be used in the 2023 IRP" and the "commissioned a third-party consulting group" study … Stakeholders would like to weigh in on this before final results
   - ELCC should also be applied to natural gas generators, including fuel supply, weather dependent outages, impact of large discrete outages, etc.
4) **Load forecast should assume load flexibility**
   - The back-half of the DESC IRP load forecast includes accelerated load growth, presumably due to EVs an electrification of other sectors.
   - This growth is uncertain and could lead to stranded assets when more modular build plans would be favored.
   - In addition, these new loads have the potential to be much more flexible than today's loads. The IRP should have explicit assumptions of flexibility
5) **Charging Constraints for Solar+Storage Should be Removed**
   - Sierra Club has provided numerous comments that the charge constraints on paired solar + storage projects should be removed from the model. This was true before the IRA, because modest grid charging would have limited financial impact and potentially large reliability benefits, but the constraints are now irrelevant due to the IRA standalone storage credit.

Questions? Please use the Chat function

DESC IRP Stakeholder Advisory Group Meeting #9

IV. 2023 IRP

2023 IRP

- Key Changes
  - 2023 DSM Potential Study
  - 2023 Load Forecast
  - Status of the Reserve Margin and ELCC Study
  - 2022 TIA Status Update

Questions? Please use the Chat function

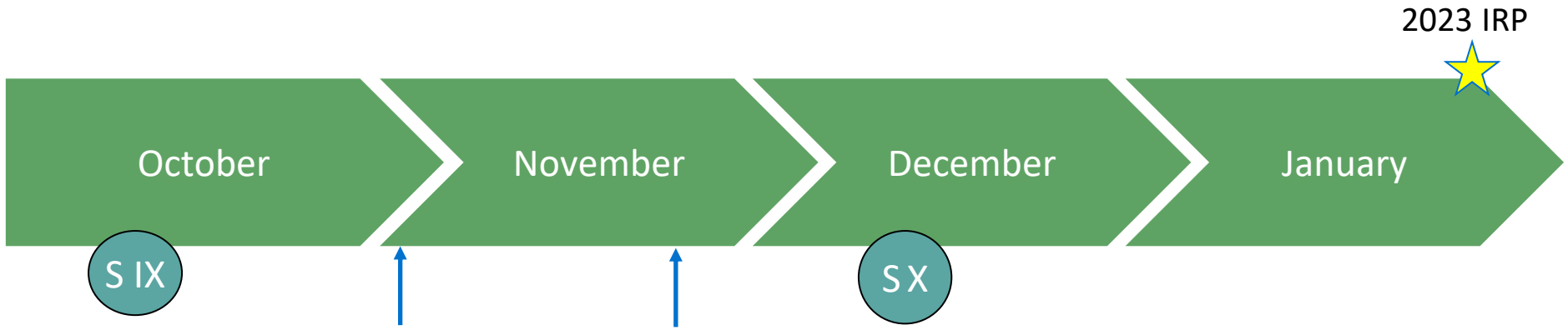
DESC IRP Stakeholder Advisory Group Meeting #9

V. Next Steps & Stakeholder Homework

Preparing for Session X and Next Steps

- Schedule to Stakeholder Meeting X
- Session IX Homework
- *Discussion*

Outlook to Session X



IRP Advisory Group Session X:

- Report on Stakeholder Feedback
- 2023 DSM PS and RM/ELCC Study
- 2023 IRP Inputs
  - Load Forecast
  - Fuel Forecasts
  - Market Scenarios
  - Candidate Resource Options
  - Risk Metrics & Resource Evaluation
- Status on 2022 TIA
- Implications of IRA on future IRPs

Session IX Homework

General Feedback

1. What topics should DESC add to the agenda at Session X or as part of a future Stakeholder Session?

2022 IRP Update Continued

2. Are there additional aspects from the 2022 IRP Update that should be considered in future IRPs or Updates?

2023 IRP

3. DESC recommends in its 2022 Update conducting three Stakeholder Advisory meetings per year in 2023 and 2024. Do you agree with DESC's stakeholder engagement plan?

Discussion - Please “Raise Hand” in the Chat

Stakeholder Website Overview

Supplemental materials and QA support documents

Registered users can submit on-topic Questions to DESC

Published QA can be viewed by public

https://www.DESC-IRP-Stakeholder-Group.com

Email DESC-IRP-Group@crai.com with questions about the website or if you have content to share with the Stakeholder Group